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Factors affecting utilization of Insecticide treated nets among people living with HIV/AIDs in Bahir Dar city, northwest Ethiopia

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Abstract: Introduction: Malaria and HIV are among the two most important global health problems of this time. All HIV-positive persons (PLHAs) in the household were encouraged to sleep under insecticide treated nets (ITNs) at all times of year. However, the information on utilization and associated factors on these groups have been limited. Objective: the aim of the study was to assess utilization of ITN and associated factors among PLHA, who are members of the three PLHA associations in Bahir City Administration, northwest Ethiopia. Methods: A community based cross-sectional study was conducted from March to May, 2013. A simple random sampling technique was used to select the study participants. Pre-tested and structured questionnaire and observation check list was used to collect the data. Each variable were analyzed by using bi variate logistic regression to know their significance and to assess the separate effects and multi variate analysis was done using backward stepwise logistic regression to control the possible confounding effect for variables with p-value <0.2 in bi variate analysis. Result: Three hundred four304 (76.8%) of PLHA utilized ITNs properly. The main reasons for those who had not have ITN and not utilized ITN were, they did not know where obtained the ITNs 20 (41.7%), ITNs were expensive 16 (33.3%), and no fear of mosquito bite at this time 60(65.2%). Knowledge about malaria risks and ITNs importance (AOR= 2.3; 95% CI 1.23- 4.40), formal education (AOR= 2.39; 95% CI 1.40- 4.08) and better income was significantly associated with ITN utilizations (AOR= 1.83; 95%CI 1.05- 3.20) Conclusion: The PLHA needs special attention on the utilization of ITN. Free provision of ITNs, awareness creation on the utilization of ITN and participate in Income generating activities are supreme important.

Keywords: Malaria Control, PLHAS, ITNS Utilization, Bahir Dar City, Ethiopia

1. Introduction

Malaria and HIV are among the two most important global health problems of this time. Malaria in combination with HIV cause more than 4 million deaths a year and are both concentrated primarily in Sub-Saharan Africa, Asia and South America. Furthermore, more than 500million cases of malaria occur every year and at least a million of them cause deaths. An estimated 30-36million people are living with HIV in Africa, resulting in more than 3 million deaths In Ethiopia, malaria is one of the most important public health problems, with more than three-quarters of the landmass (altitude <2000 m) of the country is either malariaous or potentially malariaous, and an estimated 68% (>50 million people) of the total population resides in areas at risk of malaria infections(1, 2). In 2009/2010, malaria was the leading cause of outpatient visits and health facility admissions, accounting for 14% of outpatient visits and 9% of admissions(3, 4).

In 2010, the Ethiopia Federal Ministry of Health (EFMOH) reported 4,068,764 clinical and confirmed

malaria cases to the World Health Organization (WHO) (5).Use of ITNs is one of the major vector control measures in Ethiopia. More than 20 million ITNs were distributed between 2005 and 2007, enabling 68% of the households living in malaria-endemic areas to own at least one ITN (6-8). Pregnant women, children under five years of age and PLHA are at considerably higher risk of contracting malaria and suffering from or dying of it than others (9).

Results from the malaria indictor survey 2007 reflected that significant effort of the FMOH, scale-up malaria prevention and control interventions with substantial increases in ITN ownership and use as well as malaria knowledge. The 2011 malaria indictor survey didn't show an improvement in LLIN ownership or use compared with 2007 malaria indictor survey but those seeking treatment within 24 hours and women's malaria knowledge were markedly improved(10).

All HIV-positive persons in the household were encouraged to sleep under ITNs at all times of year, however, the information on utilization and associated factors for these groups have been limited. Hence, this study aimed to identify the utilization of ITN and associated factors among PLHA. The finding would be helpful for policy makers and managers and malaria prevention and control partners to insight their plans.

2. Methods

A community based cross sectional study design was used to assess utilization of ITN and associated factors among PLHA, who were members of the three associations with atotal of 2227 PLHAs (Tesfagohe=932, Mekidem Ethiopia=1201 and Wogagen=94)in Bahir City Administration, from March to May 2013which is the capital city of Amhara National Regional State and 565 Km far from Addis Abeba. It is located at 11^{o} 38' latitude and at 37 ^{o}10' East longitudes at 1801 m above sea level. Bahir Dar is one of the tourist destinations in the country and strongly affected by Malaria and HIV/AIDS epidemics.

2.1. Sampling Procedure

The study included all PLHAs who were members of the three PLHA associations, and age greater than18 years old. Simple random sampling technique was used to select the participants and random number was generated to increase unpredictability of the selection. A total of 396 PLHA were included in the study.

participants who answered at least six and above series of knowledge assessing questions related to malaria and ITN were considered as sufficiently knowledgeable.ITN utilization was considered when presence of bed nets were hanged over the bed and participants slept in the previous night under the nets.

2.2. Data Collection and Analysis

The pretested and structured questionnaires were used to collect the data. The questionnaires were prepared in English and translated in to the local language (Amharic) and then back-translated into English to check for any inconsistencies or distortions in the meaning of words and concepts and to increase the validity of the data. The questionnaire comprised socio demography, behavioral and economical factor data's. Observation check list was used to confirm the utilization of ITNs.

The data were entered, cleaned and edited using in Epi Info version 3.5.3 and exported to SPSS version20.0 software for further analysis. Analysis was made by using bi variate and multi variate logistic regression. Each variable were analyzed by using bi variate logistic regression to know their significance and to assess the separate effects and multi variate analysis was done using backward stepwise logistic regression to control the possible confounding effect for variables with p-value <0.2 in bi variate analysis. P-value of less than 0.05 was considered as statistical significant. Odds ratio (OR) with 95% confidence interval was used to assess the presence and degree of association between dependent and independent variables.

2.3. Ethical Consideration

Ethical clearance was obtained from University of Gondar ethical review committee; both written and verbal permissions were secured from Regional Health Bureau, Bahir Dar city Administration health office, Bahir Dar city HAPCO and NAP+ Bahir Dar office. Then official letter were written to each respective PLHA associations. Informed consent was obtained from the participants before conducting data collection. All the study participants informed about the objective and importance of the study and were also informed about their right of not participating in the study at any time. Privacy and confidentiality of the information was assured and collected anonymously.

3. Results

3.1. Socio-Demographic Characteristics of the Study Population

Three hundred eighty eight (98.01%) participants were participated in the study. The mean age of respondents was 35.68 ±8.54 years. About 74% (293) were female and 44.7% (177) were married. About 31.8% (126) were attended formal education from grade 1 to 8 and 27.5% (109) of the respondents were illiterate. Regarding the occupational status of the participants, government and private employees were the highest 34.8% (138) followed by daily laborers 26% (103), merchants 24.6% (97), and housewife 6.8% (27), and drivers4% (16). The majority 97% (384) were orthodox in religion. The income distribution reveals that the poorest/lowest quintile (from the respondent's level) accounted for 32.1%. (Table1)

Table 1: *Socio demographic characteristics of the respondents in Bahir Dar city administration, northwest Ethiopia, May 2013 (n=396)*

Characteristics		frequency	Percent (%)
Age	18-24	23	5.8
	25-44	316	79.8
	45-64	54	13.6
	>64	3	0.8
Sex	Male	103	26
	Female	293	74
Marital status	Married	177	44.7
	Single	49	12.4
	Divorced	95	24
	Widowed	66	16.7
	Separated	9	2.3
Educational status	Illiterate	109	27.5
	Can read and write	86	21.7
	1-8 Grade	126	31.8
	9-12 Grade	68	17.2
	12+	7	1.8
Occupational status	Driver	16	4
	Gove./private employees	138	34.8
	Merchant	97	24.6
	Daily laborer	103	26
	House wife	27	6.8
	Others	15	3.8
Religion	Orthodox	384	97
	Muslim	7	1.8
	Protestant	5	1.2
Income	>$ 16	127	32.1
	$16-21.6	54	13.6
	$ 21.6-27	63	15.9
	$27-37.8	92	23.2
	>$37.8	60	15.2
Number of families	<3	269	67.9
	>3	127	32.1

3.2. Knowledge and ITNs Utilization

The results revealed that the majority of the respondents, 348 (87.9%) had ITNs and 304 (76.8%) of them utilized ITNs properly. The majority 339(85.6%) were sufficiently knowledgeable about malaria and ITNs. About 304 (76.8%) of respondents heard information from Health professionals and 57 (14.4%) were from mass medias. Of those had an ITNs, the majority 261(75%) had one ITN. The major source of the nets, 327 (93.9%) were free provision by the government and malaria prevention and control partners. All family members, 228(57.6%) and 65 (16.4%) PLHAs slept under the bed nets prior night to the survey day. Lack of information where to obtain ITNs 20 (41.7%), lack of money to purchase it 16 (33.3%) and lack of awareness on its usage 7 (14.6%) were the main reasons for unavailability of ITNs in their home (Table 2).

Table 2: *Availability and status of ITN and knowledge of the respondents in Bahir Dar city administration, northwest Ethiopia, May 2013. (n=396)*

Characteristics		frequency	Percent (%)
Knowledge about malaria and ITNs	sufficiently knowledgeable	339	85.6
	Not sufficiently knowledgeable	57	14.4
Source of information	Health professionals	304	76.8
	Media	57	14.4
	Community	35	8.8
Availability of ITN	One	261	75
	Two	79	22.7
	Three	8	2.3
Source of ITN	Buying	21	6.1
	Freely from government/NGo	327	93.9
Sleep under ITN prior to survey day	All family	228	57.6
	PLHAs	65	16.4
	<5 years children	22	5.6
Reasons not having ITNs	Nets are expensive	16	33.3
	Not know the source where they got	20	41.7
	Nets have not any use	7	14.6
	Others	5	10.4

The main reason that they were not using ITNs was no fear of mosquito bite at this time 60 (65.2%), ITN caused thermal stress 31(33.7%) and took time every night 19(20.7%). (Fig2)

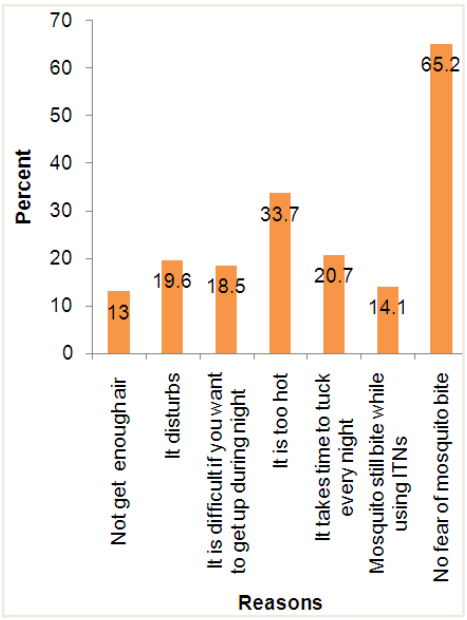

Fig 2: *Respondents reasons not using ITN in Bahir Dar city administration May, 2013*

3.3. Associated Factors for ITN Utilization

Among the potential associated factors explored regarding utilization of ITNs among PLHAs, having sufficient knowledge about transmission of malaria and ITNs, educated formal education (primary to university level), employed in government/private organization, had better income were significant predictors.

The respondents those who have sufficient knowledge about malaria and ITNs were 2.3 times more likely to utilize ITN than those who have insufficient knowledge about malaria and ITNs (AOR=2.3; 95% CI 1.23-4.40). In the study educated formal education (primary to university level) were 2.4 times more likely to utilize ITN than those not educated formal education (AOR=2.39; 95% CI 1.40- 4.08), beside this those who have better income were 1.8 times more likely utilize ITN than have less income (AOR=1.83; 95%CI1.05-3.20) and also those are employed in government/private organization were 3 times less likely utilize ITN than non employees (AOR=0.33;95%CI 0.19-0.57)(Table 3).

Table 3: *Variables associated with ITNs utilization in Bahir Dar city administration, northwest Ethiopia, May 2013.*

Variables(n=396)		Utilization of ITN		COR(95% CI)	AOR(95%CI)	p-value
		yes	No			
knowledge status	Have Sufficient Knowledge	267	72	1.85(1.07, 3.19)*	2.32(1.23, 4.40)*	0.01
	Not have sufficient Knowledge	37	20	1		
Educational status	Not have formal education	136	59	1		
	Have formal education	168	33	5.10(3.51, 7.39)*	2.39(1.40, 4.08)*	0.001
Occupational status	Non employees	201	47	1		
	Employees	103	45	0.54(0.32, 0.88)*	0.331(0.19, 0.57)*	<0.001
Income	Below mean(500)	177	67	1		
	Above mean	127	25	5.08(3.31, 7.80)*	1.829(1.05, 3.20)*	0.034
Number of families	<3	212	57	3.72(2.78, 4.98)*	-	
	>3	92	35	1	-	
Age	<45	274	77	1.78(0.91,3.48)	-	
	>45	30	15	1		
Sex	Male	76	27	1	-	
	Female	228	65	1.25(0.74,2.10)	-	
Marital status	With couples	136	41	1.01(0.63,1.61)	-	
	Without couples	168	51	1	-	
Source of ITNs	Buying	17	4	1.73(0.55,5.41)	-	
	Freely from GO/NGO	278	39	1	-	

*Statistically significant at p <0.05

4. Discussion

In this study the overall utilization of ITNs were low. Respondents did not know the source of ITNs and nets are expensive are the main reasons that did not had ITN and also no fear of mosquito bite at this time, ITN caused thermal stress, took time every night and it caused disturbance are the reasons that the respondents did not use ITNs. Among the potential determinants explored regarding utilization of ITNs having sufficient knowledge about malaria and ITNs, educated formal education (primary to university), non employees with in government/private organization and have higher income are significant predictors of ITNs utilization.

In this study the overall coverage of ITN were high this is much more than another study conducted from three sites in Kenya 34.5% reported owning an optimal bed net (11), this is probably because of greatest effort taken by FMOH, HAPCO and PLHAs association to prevent malaria. Even though it is higher coverage, considering the respondents need special attention, the study area are urban &malariaous, to achieve the 6thMDGs and use of bed net are the best and east intervention methods to prevent malaria than other intervention packages the coverage is low.

The result revealed that the utilization of ITNs were 76.8% this is almost similar to other studies conducted from three sites in Kenya (Kilifi, Kisii, and Kisumu)76.9%(11), but much less than another studies conducted in Rakai, Uganda 91% ,this is because in Uganda ITN utilization were followed by a special program. Like ITN coverage considering the respondents need special attention, the study area are urban &malariaous, to achieve the 6thMDGs and use of bed net are the best and east intervention methods to prevent malaria than other intervention packages the utilization is very low.

As a result the reason not having ITNs are respondents did not know the source of ITNs and nets are expensive this is similar to another studies conducted in Nigeria lack of money to buy the commodity and did not know where to buy the net. This is not surprising because majority of the PLHA are not have formal education and have no means of livelihood. Although the ITNs are distributed freely, it is still impossible for them to replace the nets those are out of use because of lack of money (12).The reason that they were not using ITNs was it is too hot/heat this is also similar to another studies conducted in Nigeria (12) and Rakai, Uganda (13).Even though not described in other studies no fear of mosquito bite at this time, took time every night, it caused disturbance, it is difficult if you want to get up during night, mosquito still bite while using ITNs and there is no enough air are the main reason that they were not using ITNs this is because most of the respondents are not have formal education ,low income and have information about burden of malaria are decreased.

Among the potential determinants explored regarding utilization of ITNs PLHAs who are a member of three PLHAs association in Bahir Dar city administration, having sufficient knowledge about malaria and ITNs, educated formal education (primary to university), non employees with in government/private organization and have higher income are significant predictors of ITNs utilization. The respondents those who have sufficient knowledge about malaria and ITNs were 2.3 times more likely to utilize ITN than those who have insufficient knowledge about malaria and ITNs(AOR=2.3; 95% CI 1.23-4.40) this is because if people know about malaria infection and the prevention methods they use ITN to protect from malaria infections. In the study educated formal education (primary to university level) were 2.4 times more likely to utilize ITN than those not educated formal education (AOR=2.39; 95% CI 1.40-4.08) this is similar to another studies conducted from three sites in Kenya (Kilifi, Kisii,and Kisumu) this is because if people education formal education they know the impact of malaria and their prevention methods beside this those who have better income were 1.8 times more likely utilize ITN than have less income (AOR=1.83; 95%CI1.05-3.20)this is similar to another studies conducted from three sites in Kenya (Kilifi, Kisii, and Kisumu) this is because people can buy and replace their bed nets and also those are employed in government/private organization were 3 times less likely utilize ITN than non employees (AOR=0.33;95%CI 0.19-0.57)this is similar to another studies conducted from three sites in Kenya (Kilifi, Kisii,and Kisumu) this is because even they are employed in government or private organization the majorities are not have formal education and employed as cleaners, grads and store keepers to motivate the PLHAs.

Findings suggest that lower socioeconomic status, not have sufficient knowledge about malaria and ITN, not educated formal education and have permanent job are a barrier to proper utilization of bed net.

4.1. Strengths of the Study

The study focused on the most vulnerable segment of the population. Early morning survey was carried out to observe the actual behavior of the respondents with regard to ITNs utilization. The non-response rate was almost none even during the early morning survey

4.2. Limitation of the Study

The study not includes all PLHAs live in Bahir Dar city administration. Character of HIV status (CD4 Count and WHO stage) not included in the study.

5. Conclusions

The study declared that the coverage and utilization of ITN is low. Reason not having ITNs is respondents did not know the source of ITNs and nets are expensive to replace and also the main reason that they were not using ITNs properly was no fear of mosquito bite at this time, it is too

hot and it takes time to tuck every night. Education, knowledge, income and occupation are significant predictors of ITNs utilization. Findings suggest that lower socioeconomic status, not have sufficient knowledge about malaria and ITN, not educated formal education and have permanent job are a barrier to proper utilization of bed net.

Recommendation

Free distribution of ITNs will be provided by the Bahir Dar city administration Health office and other partners' working around this area. Re-orientation of the staff of the PLHAs association to increase commitment and effectiveness in the control of malaria (using ITNs) by NAP+ and HAPCO (Bahr Dar office) is highly recommended. Intensive behavioral change communication carried out by association workers and volunteers to remove barriers on utilization of ITNs. Enhance training by NAP+ and HAPCO (B/Dar office) for volunteers' and association leaders towards proper utilization of ITNs.

Author's Contribution

YB conceptualized the research problem, designed the study, conducted field work, collected data, and drafted the manuscript.

KA was involved in preparing the research proposal, research report, and revision of the manuscript.

AB was involved in revision of the research proposal, data analysis and revision of the manuscript for publication.

ZG was involved in revision of the proposal and research report

All authors of the manuscript have read and agreed to its content.

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